

Aim:

Write a **C** program to find whether a given matrix is a **symmetric matrix** or not.

Hint: A **symmetric matrix** is a square matrix that is equal to its **transpose**.

At the time of execution, the program should print the message on the console as:

Enter the order of matrix :

For example, if the user gives the **input** as:

Enter the order of matrix : 2 2

Next, the program should print the message on the console as:

Enter 4 elements :

if the user gives the **input** as:

Enter 4 elements : 4 5 5 4

then the program should **print** on the console as:

```
The given matrix is
4 5
5 4
Transpose of the given matrix is
4 5
5 4
The given matrix is symmetric matrix
```

If the condition is **true**, then the program should **print** the result as :

The given matrix is symmetric matrix

Otherwise, the program should **print** the result as :

The given matrix is not symmetric matrix

Note: Do use the **printf()** function with a **newline** character (**\n**).

Source Code:SymmetricMatrix.c

```
#include<stdio.h>
int main()
{
    int m,n,c,d,matrix[10][10],transpose[10][10];
    printf("Enter the order of matrix : ");
    scanf("%d%d",&m,&n);
    printf("Enter %d elements : ",m*n);
    for(c = 0;c < m;c++)
        for(d = 0;d < n;d++)
            scanf("%d",&matrix[c][d]);
```

```

printf("The given matrix is\n");
for(c = 0;c < m;c++)
{
    for(d = 0;d < n;d++)
    {
        printf("%d ",matrix[c][d]);
    }
    printf("\n");
}
for(c = 0;c < m;c++)
for(d = 0;d < n;d++)
transpose[d][c] = matrix[c][d];
printf("Transpose of the given matrix is\n");
for(c = 0;c < n;c++)
{
    for(d = 0;d < m;d++)
    {
        printf("%d ",transpose[c][d]);
    }
    printf("\n");
}
if(m == n)/* check if order is same */
{
    for(c = 0;c < m;c++)
    {
        for(d = 0;d < n;d++)
        {
            if(matrix[c][d] != transpose[c][d])
                break;
        }
        if(d != m)
            break;
    }
    if(c == m)
        printf("The given matrix is symmetric matrix\n");
    else
        printf("The given matrix is not symmetric matrix\n");
}
else
    printf("The given matrix is not symmetric matrix\n");
return 0;
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter the order of matrix : 2 2
Enter 4 elements : 1 2 3 4
The given matrix is
1 2
3 4
Transpose of the given matrix is
1 3
2 4

The given matrix is not symmetric matrix
--

Test Case - 2
User Output
Enter the order of matrix : 2 2
Enter 4 elements : 4 5 5 4
The given matrix is
4 5
5 4
Transpose of the given matrix is
4 5
5 4
The given matrix is symmetric matrix

Test Case - 3
User Output
Enter the order of matrix : 3 2
Enter 6 elements : 1 2 3 4 5 6
The given matrix is
1 2
3 4
5 6
Transpose of the given matrix is
1 3 5
2 4 6
The given matrix is not symmetric matrix

Test Case - 4
User Output
Enter the order of matrix : 3 3
Enter 9 elements : 1 1 1 1 1 1 1 1 1
The given matrix is
1 1 1
1 1 1
1 1 1
Transpose of the given matrix is
1 1 1
1 1 1
1 1 1
The given matrix is symmetric matrix